

## **CLAIMS**

1. A picture coding apparatus which codes pictures on a picture-by-picture basis, and generates a random access unit as a part of a stream, the random access unit including the coded  
5 pictures, said apparatus comprising:

a coding unit operable to generate pieces of coded picture data by coding the pictures on a picture-by-picture basis;

10 a first information generation unit operable to generate sequence parameter set information that is a parameter group to be referenced for decoding all the pieces of the coded picture data;

a second information generation unit operable to generate pieces of picture parameter set information, each of which is a parameter group to be referenced for decoding each piece of the coded picture data;

15 a first storage unit operable to store the pieces of the coded picture data respectively into access units that constitute the random access unit;

20 a second storage unit operable to store the sequence parameter set information into a first access unit that is located at a head of the random access unit; and

25 a third storage unit operable to store each piece of the picture parameter set information into the first access unit of the random access unit or into an access unit in which a piece of the coded picture data that refers to the piece of the picture parameter set information is stored.

2. The picture coding apparatus according to Claim 1,

30 wherein said third storage unit is operable i ) to store the pieces of the picture parameter set information into the first access unit, and in the case where a piece of the picture parameter set information that is identical to one of the pieces of the picture parameter set information generated by the second information

generation unit is not stored in the first access unit, ii ) to store the piece of the picture parameter set information into the access unit in which the piece of the coded picture data that refers to the piece of the picture parameter set information is stored.

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3. The picture coding apparatus according to Claim 1,  
wherein said third storage unit is operable to store, into the first access unit, the piece of the picture parameter set information referenced for decoding the piece of the coded picture data stored in  
10 the first access unit.

4. The picture coding apparatus according to Claim 1,  
wherein said third storage unit is operable to store, into the first access unit, all the pieces of the picture parameter set  
15 information, each of which is referenced for decoding each piece of the coded picture data stored in a respective access unit of the random access unit.

5. The picture coding apparatus according to Claim 1,  
20 wherein said third storage unit is operable to store, into the first access unit, a predetermined number of pieces of picture parameter set information out of the pieces of the picture parameter set information generated by said second information generation unit, and to store remaining pieces of the picture parameter set  
25 information other than the predetermined number of pieces of the picture parameter set information into an access unit in which a piece of the coded picture data which refers to the piece of the picture parameter set information is stored.

30 6. A picture decoding apparatus which obtains, from a stream, a random access unit including coded pictures, each of which is stored in a respective access unit as a piece of coded picture data, and

decodes the pieces of the coded picture data on a picture-by-picture basis, said apparatus comprising:

a picture specification unit operable to specify a part of the pieces of the coded picture data to be decoded from the pieces of the coded picture data so as to specify a piece of the coded picture data stored in a first access unit that is located at a head of the random access unit;

5 a first obtainment unit operable to obtain, from the first access unit, sequence parameter set information that is a parameter group referenced for decoding all the pieces of the coded picture data;

10 a second obtainment unit operable to obtain picture parameter set information that is a parameter group referenced for decoding a piece of the coded picture data to be decoded, from the first access unit or an access unit in which the piece of the coded picture data to be decoded is stored; and

15 a decoding unit operable to decode the piece of the coded picture data to be decoded by referring to the sequence parameter set information and the picture parameter set information.

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7. A multiplexing apparatus which multiplexes pieces of information and records the multiplexed pieces of information onto a recording medium, said apparatus comprising:

the picture coding apparatus according to Claim 1;

25 a packetizing unit operable to divide a stream including random access units generated by said picture coding apparatus into packets;

30 a multiplexing unit operable to generate multiplexed data by multiplexing management information with the packet stream, the management information being necessary for separating information for each picture from the packet stream; and

a recording unit operable to record the multiplexed data

generated by said multiplexing unit onto a recording medium.

8. An integrated circuit which codes pieces of pictures and generates a random access unit including the pieces of the coded pictures, said integrated circuit comprising:

a coding unit operable to generate pieces of coded picture data by coding the pictures on a picture-by-picture basis;

10 a first information generation unit operable to generate sequence parameter set information that is a parameter group to be referenced for decoding all the pieces of the coded picture data;

a second information generation unit operable to generate pieces of picture parameter set information, each of which is a parameter group to be referenced for decoding each piece of the coded picture data;

15 a first storage unit operable to store the pieces of the coded picture data respectively into access units that constitute the random access unit;

20 a second storage unit operable to store the sequence parameter set information into a first access unit that is located at a head of the random access unit; and

25 a third storage unit operable to store each piece of the picture parameter set information into the first access unit of the random access unit or into an access unit in which a piece of the coded picture data that refers to the piece of the picture parameter set information is stored.

9. A stream which has a random access unit as a part of the stream, the random access unit including pieces of coded pictures as pieces of coded picture data,

30 wherein said random access unit including:

the pieces of the coded picture data stored respectively in access units that constitute the random access unit;

sequence parameter set information referenced for decoding all the pieces of the picture coded data, the sequence parameter set information being stored in a first access unit that is located at a head of the random access unit; and

5 pieces of picture parameter set information, each of which is a parameter group to be referenced for decoding each piece of the picture coded data,

10 said each piece of the picture parameter set information is stored in the first access unit of the random access unit or in an access unit in which a piece of the picture coded data that refers to the piece of the picture parameter set information is stored.

15 10. A picture coding method for coding pictures and generating a random access unit as a part of a stream, the random access unit including the pieces of the coded picture data, said method comprising:

generating pieces of coded picture data by coding the pictures on a picture-by-picture basis;

20 generating sequence parameter set information that is a parameter group to be referenced for decoding all the pieces of the coded picture data;

generating pieces of picture parameter set information, each of which is a parameter group to be referenced for decoding each piece of the coded picture data;

25 storing the pieces of the coded picture data respectively into access units that constitute the random access unit;

storing the sequence parameter set information into a first access unit that is located at a head of the random access unit; and

30 storing each piece of the picture parameter set information into the first access unit of the random access unit or into an access unit in which a piece of the coded picture data that refers to the piece of the picture parameter set information is stored.

11. A picture decoding method for obtaining, from a stream, a random access unit including pieces of coded pictures, each of which is stored in a respective access unit as a piece of the coded picture data, said method comprising:

5 specifying a part of the pieces of the coded picture data to be decoded from the pieces of the coded picture data so as to specify a piece of the coded picture data stored in a first access unit that is located at a head of the random access unit;

10 obtaining, from the first access unit, sequence parameter set information that is a parameter group referenced for decoding all the pieces of the coded picture data;

15 obtaining picture parameter set information that is a parameter group referenced for decoding a piece of the coded picture data to be decoded, from the first access unit or an access unit in which the piece of the coded picture data to be decoded is stored; and

20 decoding the piece of the coded picture data to be decoded by referring to the sequence parameter set information and the picture parameter set information.

25 12. A program for coding pictures on a picture-by-picture basis and generating a random access unit as a part of a stream, the random access unit including the coded pictures, said program causing a computer to execute:

generating pieces of coded picture data by coding the pictures on a picture-by-picture basis;

generating sequence parameter set information that is a parameter group to be referenced for decoding all the pieces of the coded picture data;

30 generating pieces of picture parameter set information, each of which is a parameter group to be referenced for decoding each piece of the coded picture data;

- storing the pieces of the coded picture data respectively into access units that constitute the random access unit;
- storing the sequence parameter set information into a first access unit that is located at a head of the random access unit; and
- 5        storing each piece of the picture parameter set information into the first access unit of the random access unit or into an access unit in which a piece of the coded picture data that refers to the piece of the picture parameter set information is stored.
- 10      13. A program for obtaining, from a stream, a random access unit including pieces of coded pictures, each of which is stored in a respective access unit as a piece of the coded picture data, said program causing a computer to execute:
- specifying a part of the pieces of the coded picture data to be  
15     decoded from the pieces of the coded picture data so as to specify a piece of the coded picture data stored in a first access unit that is located at a head of the random access unit;
- obtaining, from the first access unit, sequence parameter set information that is a parameter group referenced for decoding all  
20     the pieces of the coded picture data;
- obtaining picture parameter set information that is a parameter group referenced for decoding a piece of the coded picture data to be decoded, from the first access unit or an access unit in which the piece of the coded picture data to be decoded is  
25     stored; and
- decoding the piece of the coded picture data to be decoded by referring to the sequence parameter set information and the picture parameter set information.